## REMARKS

Claims 1, 3-5, 8-10, 12-14, 17 and 18 were presented and examined. In response to the Office Action, Claims 1 and 10 are amended, no claims are canceled and no claims are added. The Applicants respectfully request reconsideration in view of the following remarks and amendments.

### I.      Claims Rejected Under 35 U.S.C. § 101

Claims 1, 3-5 and 8-9 are rejected under 35 U.S.C. § 101 as raising a question of "whether the claim is directed merely to an abstract idea that is not tied to a technological art, environment or machine ... producing a concrete, useful, and tangible result." (Office Action dated August 7, 2008, page 4.)

Regarding Claim 1, Claim 1 recites:

> ... an index generation module for making said DT matrix generation module generate DT matrices by using term lists before and after edition by said term list edition module, and generating and outputting an index indicating validity of the edition from the DT matrices.

This index provides a useful, concrete, and tangible result in the form of an indication of the validity of the edition from the DT matrices. This information is useful for determining whether a hierarchical cluster of documents is valid. Document classification is greatly simplified if the document is classified using the hierarchical clustering and validity index as recited by Claim 1.

For at least the above reasons, therefore, Claim 1 and all claims which depend from Claim 1 provide a useful, concrete and tangible result in the form of an indication of the validity of the edition from the DT matrices. Hence, Claim 1 and all claims which depend from Claim 1 are directed to statutory subject matter as defined by 35 U.S.C. § 101. In view of the above, we respectfully request that the Examiner reconsider and withdraw the 35 U.S.C. § 101 of Claims 1, 3-5, 8, and 9.

## II.    Claims Rejected Under 35 U.S.C. § 103

Claims 1, 3-5, 8-10, 12-14 and 17-18 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 7,024,400 issued to Tokuda et al. ("Tokuda") in view of U.S. Publication No. 2003/0221163 to Glover ("Glover"), U.S. Publication No. 2001/0037324 to Agrawal ("Agrawal"), and U.S. Publication 2004/0205457 to Bent, et al. ("Bent"). Applicants respectfully traverse this rejection.

Claim 1 recites:

1.    A sentence classification device comprising:
      ...
      large classification generation module for generating a large classification of documents from each document in a bottom-up manner by repeatedly performing, at each DT matrix transformation, said DM decomposition method used to hierarchically cluster documents by setting said DT matrix generated by said DT matrix generation module in an initial state, causing said virtual representative document generation module to generate a virtual representative document for each cluster on a transformed DT matrix generated from the DT matrix by said DT matrix transformation module, generating a new DT matrix used for next hierarchical clustering processing by adding the virtual representative document to the transformed DT matrix and deleting documents belonging to the cluster of the virtual representative document from the transformed DT matrix, ... . (Emphasis added.)

While Applicant's argument here is directed to the cited combination of references, it is necessary to first consider their individual teachings, in order to ascertain what combination (if any) could be made from them.

In Tokuda, the cluster is given or preselected and a DLSI classifier is used to determine to which cluster an unclassified sentence belongs. Glover is directed to a technique for determining into which category an unclassified sentence containing hyperlink characters is to be classified using information associated with the unclassified sentence by providing a preselected category as a supervisor. In Agrawal, a text which has been preorganized into a hierarchical structure is used as a supervisor to determine to which class an unclassified text belongs. Bent teaches to generate a summary of each document comprising a plurality of sentences based on information on words commonly had by the sentences belonging to a cluster.

Although the Examiner has observed that the presented invention would have been obvious based on a combination of the cited references, the cluster (or a category) is given or preselected in all of Tokuda, Glover, and Agrawal. In addition, for determining to which cluster (category) an unclassified document belongs, classification is performed based on a mathematical processing or supervisor information. Even if the above three references are further combined with Bent, nothing could be achieved other than an idea to generate a summary of each document comprising a plurality of sentences based on information on words commonly had by the sentence belonging to a classified cluster.

In contrast, Claim 1 features classifying documents in a stepwise manner by repeatedly executing a graph theory called "DM decomposition." As described by Claim 1, documents are hierarchically classified in a stepwise manner by repeatedly executing the DM decomposition to transform a graph matrix. Thus, the cluster (or category) is not given in advance (not preselected) according to Claim 1. Neither is supervisor information generated to classify an unclassified sentence. Further, Claim 1 hierarchically classifies documents by repeatedly performing the DM decomposition, without determining to which preselected hierarchy a document belongs.

In light of the foregoing, it cannot be concluded that the constitutional arrangement of Claim 1 could have been realized, nor obvious, based on any combination of Tokuda, Glover, Agrawal, and/or Bent.

Claim 1 features repeated execution of a graph theory called DM decomposition to hierarchically cluster documents. It does not rely on the following known techniques or procedures to executed document clustering: use of statistical Fisher values; use of structure (e.g. hyperlink characters); use of Latent Semantic Indexing (LSI) as a mathematical processor; use of DLSI; or expressing a plurality of documents as vectors in an n-dimensional vector space.

Tokuda prepares, as a supervisor, a document contained in a preselected cluster to determine a center of the cluster in advance. Then, for an unclassified document: 1) a difference between the unclassified document and a center of each cluster to which the document belongs is expressed in a matrix to calculate an intra-DLSI from the matrix; and 2) a difference between the unclassified document and a center of each cluster to which the document does not belong is

expressed in a matrix to calculate an extra-DLSI. From the resultant two DLSIs, it is determined to which cluster each document belongs.

In contrast, Claim 1 is directed to an unsupervised classification technique for clustering ordinary unclassified texts into a hierarchical structure without using a supervisor. Meanwhile, Tokuda is directed to a supervised classification technique in which documents belonging to clusters to be used as a number of classification targets are prepared first and then the classification is performed by determining to which of the thus prepared clusters an unclassified document belongs, thus representing a technique that is obviously different from the unsupervised classification technique according to Claim 1.

Furthermore, Claim 1 describes a basic concept of repeatedly executing a graph theory called "DM decomposition" for clustering documents. Conversely, Tokuda executes a document classification process based on a mathematical process called Latent Semantic Indexing (LSI).

Referring to Bent, Bent describes a plurality of documents expressed in vectors in an n-dimensional vector space (matrix) based on their characteristic quantities (e.g., usage of words in each document) so as to cluster the documents based on proximity in the vector space. A summary of each document comprising a plurality of sentences is generated based on information on words commonly had by the sentences belonging to a cluster.

In contrast, Claim 1 describes a basic concept of repeatedly executing a graph theory called "DM decomposition" for clustering documents. Conversely, Bent executes document clustering in the course of generating a summary of each document. The method of Bent therefore comprises expressing each of a plurality of documents in vectors in an n-dimensional vector space based on a characteristic quantity of each document to thereby cluster the documents based on proximity in the vector space. No hierarchical clustering is performed in Bent.

Hence, no combination of Tokuda, Glover, Agrawal, and Bent can teach a large classification generation module that repeatedly performs, at each DT matrix transformation, a DM decomposition method used in a graph theory to hierarchically cluster documents, as in Claim 1.

For each of the above reasons, Claim 1 and all claims which depend from Claim 1 are patentable over the cited references. Therefore, please reconsider and withdraw the § 103(a) rejection of Claims 1, 3-5, 8-10, 12-14, and 17-18.

Each of the Applicants other independent claims include limitations similar to those discussed above. Therefore, all of the Applicants other independent claims, and all claims which depend on them, are patentable over the cited art for similar reasons. Consequently, Applicants respectfully request that the Examiner reconsider and withdraw the §103 rejection of Claims 10, 12-15 and 17-18.

DEPENDENT CLAIMS

In view of the above remarks, a specific discussion of the dependent claims is considered to be unnecessary. Therefore, Applicant's silence regarding any dependent claim is not to be interpreted as agreement with, or acquiescence to, the rejection of such claim or as waiving any argument regarding that claim.
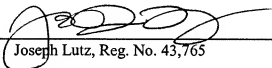
## CONCLUSION

In view of the foregoing, it is submitted that the pending claims patentably define the subject invention over the cited references of record, and are in condition for allowance and such action is earnestly solicited at the earliest possible date. If the Examiner believes a telephone conference would be useful in moving the case forward, he is encouraged to contact the undersigned at (310) 207-3800.

If necessary, the Commissioner is hereby authorized in this, concurrent and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2666 for any additional fees required under 37 C.F.R. §§1.16 or 1.17, particularly, extension of time fees.

Respectfully submitted,

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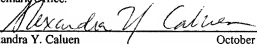
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